

REMARKS/ARGUMENTS

Claims 1 -24 remain in the application. Claims 25 - 37 have been cancelled.

Examiner Huynh is thanked for carefully reviewing the subject patent application.

All claims under consideration are now believed to be in allowable condition, and allowance is so requested.

I. Rejection under 35 U.S.C. 103 (a)

Reconsideration of the rejection of claims 1 - 8, 11 - 21, and 24 under 35 USC 103 (a) as being unpatentable over Cho et al. (USP 6,486,082) in view of Cheng et al. (US Pub. No 2005/0153537) is requested, in light of the following.

The Applicants respectfully submit that Cheng teaches a barrier layer which is comprised of nitrogen. For example, the last sentence in par. [0003] specifically points out that "oxides do not block copper ions and may easily react with copper.....a barrier layer is frequently comprised of nitrogen in the form of a metal nitride or silicon nitride". Furthermore, in par. [0016], Cheng states "A further objective of the present invention is to provide a method in which the barrier layer is comprised of silicon nitride and has good adhesion to copper". On the other hand, the intention of the claimed invention as mentioned on page 3, lines 16-19 is "an improved barrier layer or etch stop layer is required for new technologies which has a higher breakdown field and lower dielectric constant than current materials and which does not contain nitrogen that can have a deleterious effect on photoresist patterning". The Applicants also submit that Cheng

teaches away from the use of oxygen in a barrier layer according to par. [0003] cited above and in par. [0010] that states "A succession of carbon doped SiO₂ layers are not expected to function as good copper diffusion barriers in a copper damascene structure". Cheng's objective in par. [0015] is to provide a barrier layer that "prevents copper ion diffusion into adjacent dielectric layers".

The Applicants respectfully submit that none of the applied or known references address the claimed invention as described in claims 1 - 8, 11 - 21, and 24 in which a composite barrier/etch stop layer comprised of a lower SiC layer and an upper oxygen doped SiC layer is formed between a substrate and an overlying dielectric layer. The claimed invention is believed to be patentable over the prior art cited, as it is respectfully suggested that the combination of the Cho and Cheng references cannot be made without reference to the Applicant's own invention. Cho refers to a single barrier/etch stop layer while Cheng's composite barrier/etch stop is comprised of a silicon nitride layer. Applicant has claimed his process in detail. The processes of FIGS. 1 – 5 (claims 1 - 8, 11 - 21, and 24) are believed to be novel and patentable over the applied references because there is not sufficient basis for concluding that the combination of claimed elements would have been obvious to one skilled in the art. That is to say, there must be something in the prior art or line of reasoning to suggest that the combination of Cho and the Cheng references is desirable. We believe that there is no such basis for the combination.

Reconsideration of the objection to claims 9, 10, 22, and 23 is requested since the independent claims 1 and 13 are now believed to be patentable.

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Reply to Office communication of September 29, 2005

All claims are now believed to be in condition for allowance, and allowance is so requested.

It is requested that should there be any problems with this Amendment, please call the undersigned Attorney at (845) 452-5863.

Respectfully submitted,


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